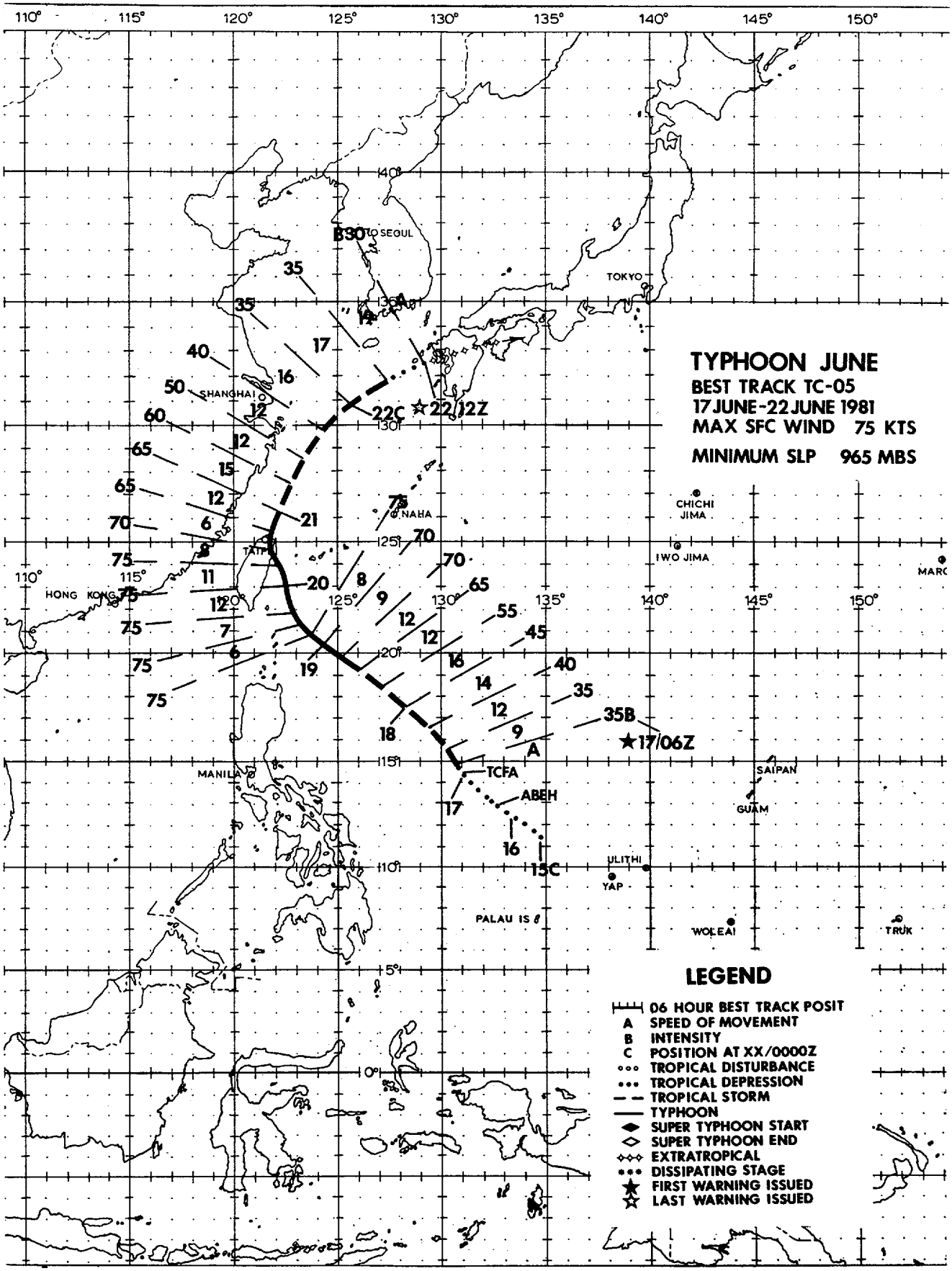
TYPHOON JUNE
BEST TRACK TC-05
17 JUNE-22 JUNE 1981
MAX SFC WIND 75 KTS
MINIMUM SLP 965 MBS
LEGEND
06 HOUR BEST TRACK POSIT
A SPEED OF MOVEMENT
B INTENSITY
C POSITION AT XX/0000Z
TROPICAL DISTURBANCE
TROPICAL DEPRESSION
TROPICAL STORM
TYPHOON
SUPER TYPHOON START
SUPER TYPHOON END
EXTRATROPICAL
DISSIPATING STAGE
FIRST WARNING ISSUED
LAST WARNING ISSUED
SEOUL
TOKYO
SHANGHAI
NAHA
TAIPEI
HONG KONG
MANILA
CHICHI JIMA
IWO JIMA
SAIPAN
GUAM
ULITHI
YAP
PALAU IS
WOLEAI
TRUK
TCFA
ABEH
22C
22/12Z
17/06Z
15C

The process for genesis of tropical cyclones through interaction with a tropical upper tropospheric trough (TUTT), (Sadler, 1976), was evident during the early development stages of Typhoon June. A TUTT was established over the Philippine Sea early in June leading to the generation of a tropical disturbance over the Palau Islands.

On the 13th of June a cell within the TUTT was observed on satellite imagery northeast of the disturbance resulting in improved organization of the disturbance as the TUTT cell tracked westward. Surface synoptic reports indicated no pre-existing circulation on the surface associated with this disturbance. The general flow pattern was converging in the area of the disturbance, then continuing northwestward into Typhoon Ike.

By the 15th the TUTT cell was northwest of the disturbed area and the potential for development of a tropical cyclone was greatly improved. The area of disturbance was optimally positioned with respect to the TUTT cell, i.e. under an upper level divergent area which served initially as an outflow mechanism. Nevertheless, progress in the development of the cyclone was very slow. Aircraft reconnaissance on the 15th indicated that a weak circulation was located 200 nm north of the Palau Islands.

Late on the 16th satellite data indicated an outflow center was beginning to form which prompted JTWC to issue a formation alert at 170100Z. The disturbance then developed its outflow aloft and banding features were evident on satellite imagery of 170600Z. At that same time aircraft reconnaissance also found that the disturbance had tropical storm strength winds. Subsequently, the first warning on Tropical Storm June was issued.

A 500 mb anticyclone was positioned over the Ryuku Islands with the ridge axis extending over much of China at the time the first warning was issued. The anti-cyclone remained virtually stationary as June tracked northwestward toward Taiwan. During the first 24 hours after the initial warning June did accelerate, but slowed again to her original speed the following 24 hours. The area in which the acceleration occurred was practically void of wind data at the 500 mb level and therefore no suitable explanation can be made for this occurrence.

It is interesting to note that the TUTT cell which helped form June moved ahead of her along a parallel track until she hit Taiwan. June maintained a position southeast of the TUTT cell throughout this period. Further, June intensified to a maximum of 75 kt (39 m/s) while tracking behind the TUTT cell. Satellite imagery at 191029Z (Fig. 3-05-1) showed Typhoon June at her maximum intensity.

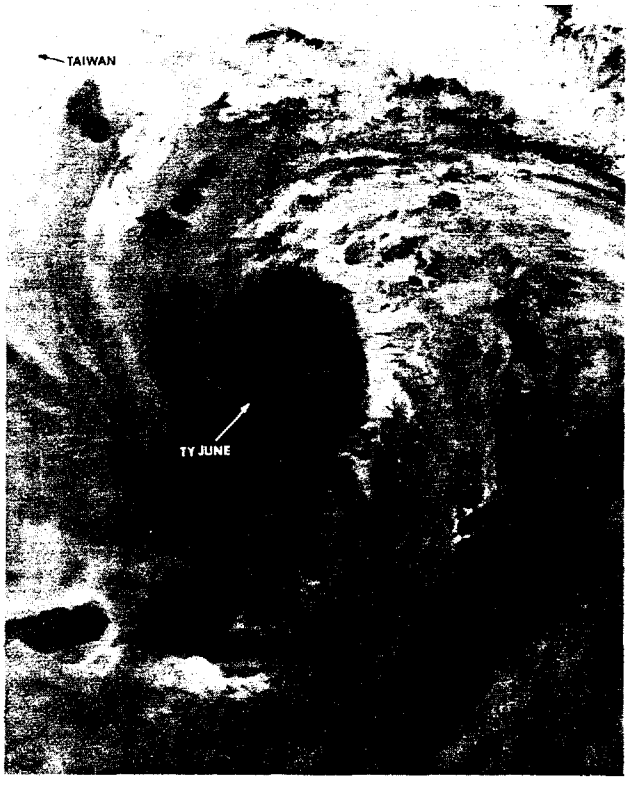

FIGURE 3-05-1. *Satellite imagery at 191029Z of Typhoon June after attaining a maximum intensity of 75 kt (39 m/sec). (NOAA 6 infrared imagery)*

June hit Taiwan with winds of 75 kt (39 m/sec). Radar observations at Hua-Lien (WMO 47918) provided essential information to JTWC when June began to deviate from a northward direction toward a point 40 nm (74 km) southeast of Taipei. Figure 3-05-2 is a picture of the radar presentation taken at Hua-Lien at 0500Z on the 20th (photograph courtesy of the Central Weather Bureau, Taipei, Taiwan), when June had an intensity of 75 kt (39 m/sec) 9 hours before landfall.

June was forecast to recurve in all but two warnings. The initial reason for recurvature was based on a 500 mb trough that was expected to move over Eastern China, with the anticyclone over the Ryuku Islands moving eastward. As June neared Taiwan it was apparent that these forecast upper air movements had not taken place. June's forecast track was then changed, for two warnings, to reflect the strength of the anticyclone north of her and indicating a more westward track with landfall over China.

Another reason for the change in the forecast track was the lack of a large cirrus plume extending to the northeastward from June. Typically, several hours, or days, in advance of the event, a cirrus plume is seen to extend northwestward from a tropical cyclone that will soon recurve. The plume generally extends far downstream in the direction of the upper level winds, which greatly influence the direction and speed of the tropical cyclone after recurvature. June did not exhibit a cirrus plume either before or after recurvature.

Later upper air data indicated that a new anticyclone formed over China at 500 mb with a resultant weakening in the ridge between the anticyclones over China and the Ryukyu Islands. Recurvature was again forecast because of this change at 500 mb.

June began to weaken gradually after recurvature. The 500 mb anticyclone that had formed over China and allowed June to recurve, moved southward as a trough approached China's coast. As June neared Japan, she began to interact with a weak frontal system extending southwestward and entrain cold air supplied by the trough. At 1200Z on the 22nd the final warning was issued on June as she became extratropical before tracking over Kyushu.

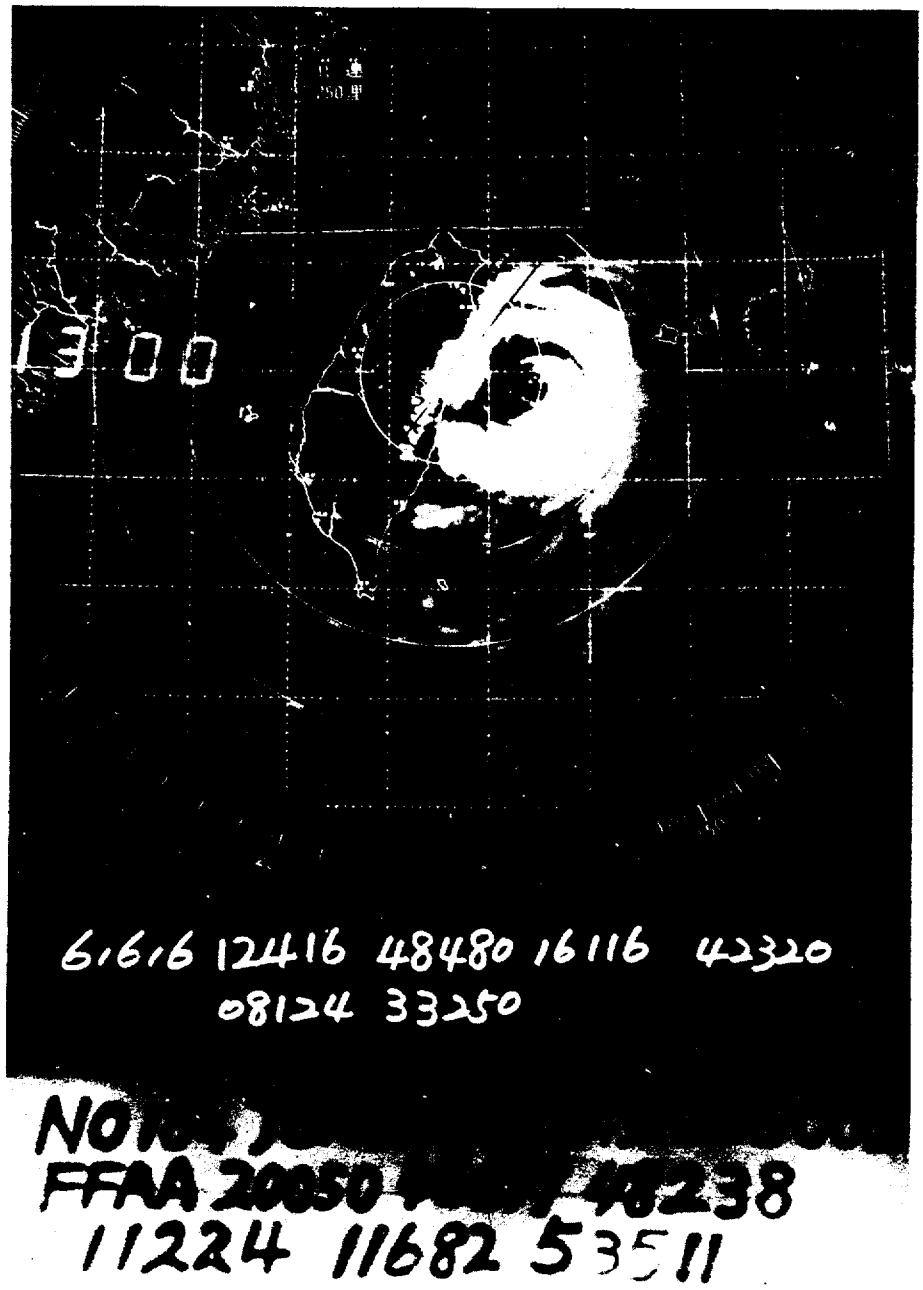

FIGURE 3-05-2. Typhoon June as seen by radar at Hua-Lien, 20 June 1981, 0500Z. (Photograph courtesy of the Central Weather Bureau, Taipei, Taiwan.)